AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application.

1. (Original) A method of determining defect detection sensitivity data, comprising:

taking image data from the desired surface areas of each of semiconductor devices,

processing at least two of the image data through arithmetic operations and comparing the processed image data with a parameter of defect detection sensitivity substituted by predetermined threshold data to obtain information on defects in the desired areas at least in one-to-one correspondence with any of the image data arithmetically processed,

repeating more than once the step of varying the parameter of the defect detection sensitivity to obtain the defect information, so as to obtain more than one sets of combination data on a value of the parameter of the defect detection sensitivity correlated with the defect information,

processing more than one sets of the combination data to produce a mathematical function expressing a relation of the desired statistical data with the parameter of the defect detection sensitivity, the mathematical function being used to determine defect detection sensitivity data, the defect detection sensitivity data being used in obtaining the information on the defects in the desired surface areas of the semiconductor devices under defect inspection, and the defect detection sensitivity data

defining an existence range of the defect information in the image data which are taken from the desired surface areas of each semiconductor device and which are arithmetically processed in the previous step.

2. (Original) A method according to claim 1, wherein the taking image data from the desired surface areas of each of semiconductor devices includes directing light or electron beam to the desired surface areas and receiving reflected light or electrons from the desired surface areas to pick up the image data.

3. (Currently amended) A method according to claim 1, wherein in prior to the taking image data from the desired surface areas of each of semiconductor devices, the semiconductor devices have artificial defects provided in advance, and any or all of types, ~~dimensions~~ sizes, the number, coordinates are initially known.

4. (Original) A method according to claim 1, wherein the image data are picked up in digitized image data format.

5. (Original) A method according to claim 4, wherein the arithmetic operations are executed for pixels of the digitized image data on the single-pixel-at-a-time basis.

6. (Original) A method according to claim 5, wherein the arithmetic operations are directed to find a difference of gradation values between one pixel and another.

7. (Original) A method according to claim 1, wherein the obtaining information on defects in the desired areas includes getting data on the number of the defects.

8. (Original) A method according to claim 1, wherein the desired statistical data is data on a standard deviation of the number of the defects in the desired areas.

9. (Original) A method according to claim 8, wherein the data on a standard deviation are expressed as a function of the parameter of the defect detection sensitivity, and the defect detection sensitivity data is fixed as a value of its parameter when a linear differentiation of the standard deviation data leads to a predetermined differential value.

10. (Original) A method according to claim 9, wherein the predetermined differential value is zero.

11. (Original) A method according to claim 1, wherein the function is approximated to two or more additional functions to find an intersection of the two or more functions serving as a partitioning point, and a range within which the defect detection sensitivity data is to be determined is specified based upon the value of the parameter of the defect detection sensitivity corresponding to the partitioning point, thereby eventually determining the defect detection sensitivity data within the specified range.

12. (Original) A method according to claim 1, wherein the function is partitioned in arbitrary sections within the range of the parameter of the defect detection sensitivity, the function is integrated by the parameter of the defect detection sensitivity in each of the sections, an integral value corresponding to each of the sections is used to specify either of the sections within which the defect detection sensitivity data is to be

determined, thereby determining the defect detection sensitivity data within the specified range.

13. (Original) A method of determining defect detection sensitivity data, including determining the defect detection sensitivity data in accordance with the method of Claim 1, and adding an arbitrary offset value to the defect detection sensitivity data determined in the previous step, so that the defect detection sensitivity data is eventually fixed at the sum as a result of the addition.

14. (Currently Amended) A method of ~~supervising~~ controlling defect detection apparatuses, the method exploiting first defect detection sensitivity data determined in accordance with the method of Claim 1 during a first period of time, and second defect detection sensitivity data determined in accordance with the method of Claim 1 during a second period of time prior to the first period of time, thereby performing a maintenance of semiconductor device defect inspection apparatuses over time.

15. (Currently Amended) A method of ~~supervising~~ controlling defect detection apparatuses according to claim 14, wherein the first and second defect detection sensitivity data are exploited to compute a correlation coefficient of the first and second defect detection sensitivity data, and it is determined if the computed correlation coefficient is within a predetermined range, a maintenance of semiconductor device defect inspection apparatuses over time being performed, depending upon the determination.

16. A method of ~~supervising~~ controlling defect detection apparatuses according to claim 14, wherein more than one points of the first and second defect detection

sensitivity data are plotted in coordinate system representing the first defect detection sensitivity data along a first axis and the second defect detection sensitivity data along a second axis, a tilt of an approximation line of the first and second defect detection sensitivity data is computed, and it is determined if the tilt of the approximation line is within a predetermined range, a maintenance of semiconductor device defect inspection apparatuses over time being performed, depending upon the determination.

17. (Currently Amended) A method of ~~supervising~~ controlling defect detection apparatuses according to claim 14, wherein the defect detection sensitivity data is fixed with each of more than one defect detection apparatuses in accordance with the method of Claim 1, and the defect detection sensitivity data is exploited in supervising a state of each of the defect detection apparatuses.

18. (Original) A method according to claim 17, wherein the defect detection sensitivity data fixed with each of the defect detection apparatuses is exploited to compute a correlation coefficient of the defect detection sensitivity apparatuses, and it is determined if the correlation coefficient is within a predetermined range, a supervision of a state of the defect detection apparatuses being performed, depending upon the determination.

19. (Original) A method according to claim 17, wherein more than one points are plotted in coordinate system representing the defect detection sensitivity data of the different defect detection apparatuses along different axes, respectively, to compute a tilt of approximation line, and it is determined if the tilt of the approximation line is within a predetermined range, a supervision of a state of the defect detection apparatuses being performed, depending upon the determination.

20. (Original) An apparatus of determining defect detection sensitivity data, comprising

an image data pickup unit directing light or electron beam to the desired surface areas of each of semiconductor devices and receiving reflected light or electrons from the desired surface areas to pick up the image data,

a first arithmetic operation unit processing at least two of the image data through arithmetic operations and comparing the processed image data with a parameter of defect detection sensitivity substituted by predetermined threshold data to obtain information on defects in the desired areas at least in one-to-one correspondence with any of the image data arithmetically processed, and repeating more than once the step of varying the parameter of the defect detection sensitivity to obtain the defect information, so as to obtain more than one sets of combination data on a value of the parameter of the defect detection sensitivity correlated with the defect information, and

a second arithmetic operation unit processing more than one sets of the combination data to produce a mathematical function expressing a relation of the desired statistical data with the parameter of the defect detection sensitivity, the mathematical function being used to determine defect detection sensitivity data, the defect detection sensitivity data being used in obtaining the information on the defects in the desired surface areas of the semiconductor devices under defect inspection, and the defect detection sensitivity data defining an existence range of the defect information in the image data which are taken from the desired surface areas of each semiconductor device and which are arithmetically processed in the previous step.

21. (Currently Amended) A method of detecting defects in semiconductor devices, comprising: exploiting various data to produce a mathematical function expressing a relation of cost of manufacturing the semiconductor devices with parameters of cost factors including semiconductor device defect inspection conditions and influencing the cost, the various data being stored in a processing device database, a yield database, and an electric property database, respectively, the processing device database storing data related to processing devices used in manufacturing semiconductor devices, the yield database storing data related to yields of the semiconductor devices, and the electric property database storing data on the results of a tester inspection and data on the results of the matching of the tester inspection results with the defect information of the semiconductor devices,

determining the cost factors through the mathematical function expressing the relation of the cost with the parameters of the cost factors,

carrying out the semiconductor device defect inspection, relying on the cost factors and the defect detection sensitivity data fixed by ~~any of~~ the ~~methods~~ method of ~~Claims~~ Claim 1 **[[to 3]]**,

producing data on renovated yields from the information on defects detected by the semiconductor device defect inspection and the data on yields stored in the yield database,

producing data on renovated results of the matching of the defect information with the results of a tester inspection, and

using feedback data of the renovated yield data and the renovated matching result data to repeatedly produce a mathematical function expressing a relation of the cost with the parameters of the cost factors.

22. (Original) A method according to claim 21, wherein in prior to the semiconductor device defect inspection, the method of Claim 14 is applied to supervise the semiconductor defect detection apparatus.

23. (Original) A method according to claim 21, wherein in the context of the mathematical function expressing a relation of the cost with the parameters of the cost factors, the cost factors are fixed at values of the parameters of the cost factors that induces a minimization of the cost.

24. (Original) A method according to claim 21, wherein the number of the semiconductor devices that are to be inspected is a requirement in newly producing yield predicting data derived from the data of the renovated yield, and the cost factors are fixed at values of the cost factors added by a certain offset value determined depending upon the requirement in number of the inspected semiconductor devices.

25. (Original) A method according to claim 21, wherein the cost factors are fixed at values of the cost factors added by a certain offset value determined depending upon an availability ratio of the defect detection apparatus.

26. (Currently Amended) A semiconductor device defect detection apparatus, comprising:

a processing device database storing data related to processing devices used in manufacturing semiconductor devices

a yield database storing data related to yields of the semiconductor devices,

an electric property database storing data on the results of a tester inspection and data on the results of the matching of the tester inspection results with the defect information of the semiconductor devices,

a cost calculating unit exploiting the data stored in the processing device database, the yield database, and the electric property database, respectively, to produce a mathematical function expressing a relation of cost of manufacturing the semiconductor devices with parameters of cost factors including semiconductor device defect inspection conditions, ~~and influencing~~ said cost factors influencing the cost, and determining the cost factors through the mathematical function expressing the relation of the cost with the parameters of the cost factors,

a semiconductor device defect detection apparatus carrying out the semiconductor device defect inspection, relying on the cost factors and the defect detection sensitivity data fixed by the method of Claim 1, and

yield data management unit producing data on renovated yields from the information on defects detected under the defect inspection by the semiconductor device defect detection apparatus and from the data on yields stored in the yield database, producing data on renovated results of the matching of the defect information with the results of a tester inspection, and transferring feedback data of the renovated yields and the renovated matching results to the cost calculating unit.